

PROCEEDINGS
OF THE
BIOLOGICAL SOCIETY OF WASHINGTON

THE HAWTHORNS OF NORTHEASTERN WISCONSIN.

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The genus *Crataegus* is variable and has always given trouble to field botanists. As a result of deficient material and imperfect observations there is a confused treatment, even in leading manuals, and this may be the cause of the excessive splitting of species in recent years. There are six distinct species or rather groups in northeastern Wisconsin each including forms which are not entitled to specific rank although exhibiting some constant differences. These variant forms should be considered only as subspecies. Hawthorns, like roses, willows, oaks and many other woody plants furnish valuable material for research to evolutionists, who have hitherto turned their attention chiefly to the animal kingdom. The variability and polymorphism are due to the influence of the environment and soil, the climate, effects of age and injury, crossing, and progressive heredity. In the region of Green Bay, where the retiring waters of bay and lake left distinct evidences of former higher levels in Pleistocene and Recent geological time, variation due to changed environment is illustrated especially by the wild roses. Thus individuals growing on the younger formations of moist and wet sand, or near the surf, present characters plainly different from those of others of the same species growing on the higher alluvial or Pleistocene ridges. *Crataegus* like *Rosa* is very susceptible to such

influences. Therefore no expert author should venture to base a new species on a single specimen or a single or slight character. The definitive characters should be constant and direct. Our attention is first of all attracted by the external differences in plants. Form, aspect, and habit, therefore, are all important in the discrimination of variations and in the elevation of subspecies to species, at least for popular recognition. Plants like the hawthorns require observation and investigation under different conditions of environment before being subjected to further specific or subspecific differentiation.

After hunting for years for *Crataegus crus-galli* I found on the peninsula between Lake Michigan and Green Bay, on Washington Island, the next island north of Death Door, Wisconsin, a group of nice trees with shining, thick leaves and rather long thorns. I believed I had at length found the desired species or a variety of it, but later discovering my mistake I called this form *C. punctata decipiens*, and reached the conclusion that *C. crus-galli* does not occur in our northwest. This view is supported by a specimen received in exchange from the National Herbarium labelled "*Crataegus crus-galli*" and collected in Minnesota. Although I have not seen the buds and fruits I regard it as *C. tomentosa*. The error, due to the meagre and misleading descriptions given in current manuals, is very excusable.

Finally, mention should be made of some interesting observations on the effects of the cold and moist atmosphere near Lake Michigan. At the outset the entire vegetation on the peninsula between Green Bay and the lake is delayed 3 or 4 weeks as compared with that of the surrounding region. Secondly, the atmospheric conditions due to the proximity of the water appear to produce variations and freaks in species, even shrubs seeming to be changed into trees. Near Kewaunee, Wisconsin, on an elevated plain, I met with a cluster of trees, each about 30 feet high and 10 inches in diameter, with the characters of *Acer spicatum*, the well known shrub. All but one of these trees have since been exterminated by clearing. On the southern grassy slope of this plain is a little grove of *Crataegus* trees, 12-18 feet high and 3-5 inches in diameter. I am, however not certain as to their specific identity since I have not seen the buds and flowers.

Since the nomenclature of *Crataegus* seems to be somewhat unsettled, I have employed the familiar names while embodying my own views in the following descriptions. A series of specimens, including the types of the new forms, has been presented to the Biological Society of Washington, and by the latter turned over to the United States National Museum.

Artificial Key to the Hawthorns of Northeastern Wisconsin.

- I. Fertile shoots of the current season pubescent.
1. Leaves cordate, truncate or rounded at base, tomentose beneath; petioles not margined, tomentose 1. *C. subvillosa* Schrader.
 2. Leaves acute or acuminate at base; petioles margined.
 - a. Sepals (calyx lobes) toothed (glandular in No. 3).
 - * Anthers red; petioles and outer surface of sepals pubescent; flowering two weeks later than No. 1 2. *C. tomentosa* L.
 - ** Anthers white; sepals glabrous outside (sometimes hairy at base) - - - 3. *C. macracantha* Lodd.
 - b. Sepals entire, glandless, their outer surface glabrous in the upper half - - - - 4. *C. punctata* Jacq.
- II. Fertile shoots of the current season glabrous.
1. Corymb and calyx pubescent; sepals deeply (almost fimbriately) toothed; petioles not more than one-sixth as long as the blade, margined, groove hairy and impressed.
 - a. Anthers red; stamens 12-20; calyx cup hairy; leaves hairy beneath, especially on the nerves 5. *C. pyrifolia* Ait.
 - b. Anthers white in bud, gradually turning brown; stamens 8-12 (rarely more), calyx cup and leaves beneath usually glabrous - - - 6. *C. pyrifolia sylvestris* subsp. nov.
 2. Corymb and calyx cup glabrous*; sepals slightly dentate or entire; petioles at least one-third as long as the blade, glabrous beset with few glands.
 - a. Anthers white; sepals toothed and conspicuously glandular; petioles margined, blade acute at base, its teeth more or less obtuse if the small terminal gland is removed - - - - 7. *C. caliciglabra* sp. nov.
 - b. Anthers red; sepals with few gland-tipped teeth or entire and glandless; petioles marginless by tightly inrolled edges, filiform, usually more than one-half as long as the blade - - - - 8. *C. coccinea* L.

(For subspecies see below, description No. 8).

* In some forms of *C. coccinea* slightly scattered with soft hairs, but glabrate.

Descriptions of species and subspecies.**1. *Crataegus subvillosa* Schrader.**

A tree with gray, ascending branches, 20-30 feet high and 6-9 inches in diameter. It is easily distinguished by the generally large, densely villous-tomentose leaves with mostly cordate, truncate or even acute bases and slender marginless petioles. The corymbs and flowers are large; sepals hairy both within and without, teeth and glands none or obscure; stamens 12-20 with whitish, later brownish, anthers; the disk with mostly 3-4 styles. The dull red fruits vary in size up to that of cherries and are globose, ovoid or obconical. Thorns few, black, slender, or short and stout. Flowering in the second half of May. Not rare; on banks, slopes, and in moist soil.

2. *Crataegus tomentosa* L.

A slender, crookedly bent but upright, gray tree with few short branches, 8-10 feet high and as thick as a heavy walking stick. The leaves are ovate or obovate (often somewhat oblong or roundish), acute at top, acute or acuminate at base, the blade decurrent on the short, tomentose petiole almost to the end; marginal teeth cuspidately tipped, the blade pubescent beneath, glabrous above; the bracts of the buds are large and red, of the flowers linear-lanceolate, brownish, obscurely toothed and glandless. The compound corymb, the calyx cup, and the usually irregularly toothed and glandless or minutely glandular sepals are finely tomentose. Stamens 12-20; anthers red; pistils 2 or 3; fruits small, somewhat pear-shaped, oblong when young, bulged at the middle like a cask, and quite red when ripe. Not rare in fertile soil or clay, which it prefers. It is unmistakably distinct and easily recognized by its late flowering, about June 10-25, two weeks later than the species last described.

3. *Crataegus macracantha* Lodd.

This species is distinguishable from the last by the white anthers. It is a thorny, spreading, gray shrub, 6-10 feet high. Leaves generally round-ovate, acute or acutish at each end, obscurely lobed and toothed (teeth tipped with a small gland, obtuse or obtusish if this gland is removed), hairy beneath; petiole usually rather slender, mostly with few glands, margined and hairy. Bud scales reddish; stipules and bracts lance-linear, quite glandular; corymbs compound, hairy, as are the calyx cups; sepals glabrous outside, toothed, and glandular on the short teeth. Stamens 8-10; pistils 4 (3-5); fruits red, ovoid or globose, as large as big peas. Thorns dark brown, shining, rather

long and numerous, as are the flowers and fruits. Flowering the latter half of May. Common. Prefers moist soil on banks and slopes (Compare No. 7, below).

4. *Crataegus punctata* Jacq.

A large shrub or usually a small tree, 12-25 feet high and 4-6 inches in diameter, with numerous, nearly horizontal, far-spreading, gray branches and few gray, slender thorns. Leaves obovate to spatulate, acute at apex, cuneate at base, decurrent on the hairy or tomentose, short petiole (in some forms the latter only margined), entire in the lower, irregularly toothed in the upper part, the teeth obscurely glandular or glandless, the nerves hairy underneath. Bud scales brown, but involucrel leaves rather large, obovate or spatulate, greenish, brown, or whitish. Stipules and bracts chiefly linear, slender, brown and glandular on the margins, of various forms in sterile shoots. Corymbs compound, with profuse, large flowers. Calyx cup densely hairy or tomentose; sepals entire and glandless, glabrous outside in the upper half. Stamens 12-20; anthers at first whitish, later brown and dark; pistils 3; fruits usually large, globose, reddish or yellowish-green with whitish dots. This conspicuous tree with a handsome top is densely covered with white flowers at the end of May and the early part of June. It prefers calcareous and open clay-soil pastures. Common, especially on the peninsula between Lake Michigan and Green Bay.

Variations from the type are occasionally observed in the form and size of the leaves, the sepals, the glands, degree of pubescence, etc. The variety with shining, thick leaves and with more numerous, rather larger thorns is *C. punctata decipiens* subsp. nov. (type specimen, No. 431,497, U. S. National Herbarium), *C. crus-galli* is not found in the region under consideration.

5. *Crataegus pyrifolia* Ait.

A tree with gray ascending branches forming a rather close, somewhat obtuse top. Shoots of the preceding season brown and shining, those of the current year green, later brown; bud scales coriaceous, brown; involucrel leaves obovate to spatulate, red with a green zone along the margins, glandular; stipules and bracts very fugaceous, mostly filiform or linear, and glandular; leaves broadly elliptic but acute at each end (or ovate or obovate), dull, hairy on the nerves on both faces, the pubescence extending down on the upper side of the longitudinal groove of the otherwise glabrous, glandless, margined, short petiole which rarely exceeds one-sixth the length of the blade; teeth of blade glandless or obscurely glandular. Corymb compound, pubescent; calyx cup hairy; sepals almost fimbriately toothed and glandular, glabrous outside; stamens usually 12 to 20; anthers red; pistils 2-3; fruits the size of peas,

globose or globular, red. Thorns generally short and stout, straight, dark brown and shining, gray on older branches. Flowering toward the end of May. Not rare on rich and moist soil.

6. *Crataegus pyrifolia sylvestris* subsp. nov.

This plant, probably a woods-living form, is closely allied to the last. It is, however, distinguished by having usually 10 (7-12) stamens; anthers white becoming yellow, then brown; the sepals outside glabrous or nearly so, in general less hairy on the corymb; bracts narrowly lanceolate to linear or filiform; the petioles slightly longer, often one-fourth as long as the blade; the upper involucral leaves sometimes uniform whitish or approaching the last with greenish or yellowish margins, usually slender, longer, often bent, numerous on shrubs, fewer on trees. A slender tree (8-15 feet high) with slender branches, occurring not rarely in wet, moist, shady woods. Flowering with the last. Type specimen, No. 431,500, U. S. National Herbarium.

7. *Crataegus caliciglabra* sp. nov.

A low, spreading, thorny shrub on borders of open fields and in groves, similar in general to No. 3, but distinguished by the following characters: shoots of the current year glabrous; calyx, except the upper side of the sepals absolutely glabrous; the whole plant otherwise glabrous; the petiole obviously marked with 3-5 glands; the uppermost involucral leaves green with a reddish midnerve, spatulate; the lanceolate, slender sepals usually longer than the cup when flowering. This species is distinguished from *C. pyrifolia* and *C. coccinea* by its white anthers and the more obtuse teeth of the blade. Flowering with the last. Type specimen, No. 431,498, U. S. National Herbarium.

8. *Crataegus coccinea* L.

A polymorphous shrub, nearly every individual exhibiting some variation. The young plants vary from the old ones, the solitary individuals from those in groups. According to the environment characters disappear, are added, or fail to present a distinct appearance. For these reasons the following description includes several forms recently regarded as species.

The typical form is only a shrub, 3 to 10 feet high. The branches are gray, ascending, more or less divergent, roundish, striate or irregularly angular, and somewhat undulately-bent; the twigs yellowish or brownish; the fertile shoots of the season glabrous; the thorns short and stout or long and slender, brown (gray on old twigs), mostly black at top and brown-red below, sometimes with a slightly silver-gray cover; petioles

filiform, slender, marginless, usually as long as or longer than half the length of the blade, beset with few glands. The blade is broad-ovate in outline, acute at the top, obscurely protracted at the cordate, truncate or rounded base, lower face soon glabrous, teeth sharply acute, slightly glandular-tipped or glandless. Bud scales obovate, red; stipules like the bracts linear to narrow-lanceolate, reddish or yellowish, soon deciduous, lined on the margins with brown or yellow glands. Corymbs compound, glabrous, sometimes thinly scattered with deciduous or fugaceous soft hairs. Calyx cup glabrous; sepals glabrous outside, slightly hairy or smooth inside, either with a few or more basal glandular teeth or entire and glandless. Stamens in some forms 12-20, usually not exceeding 12; anthers red; pistils 3-5; fruits ovoid, red, the size of large peas. Flowering from the end of May. Frequent on dry soil.

In the type, cordate and truncate leaves are prevalent; the sepals more or less toothed and glandular, hairy inside; the stamens rarely more than 12, and the thorns usually slender. *Crataegus coccinea eglandulosa* subsp. nov. (type specimen, No. 431,494, U. S. National Herbarium), on dry, exposed soil, has entire (or nearly so), glandless sepals, being glabrous within or obscurely hairy; usually 5-8 stamens; 3 or 4 styles; and usually stout and short thorns. *C. schuettei* Ashe, close to the type and perhaps only a variety, is distinguished by the toothed and glandular, ventrally hairy sepals, the mostly 12-20 stamens, the petioles with a deep, hairy, longitudinal groove. It is of slightly higher growth and prefers somewhat moist soil.